

## REMARKS

Claims 1-11, 13-17, 19-35, and 37-52 were pending in the above identified application. The Examiner has rejected claims 1-11, 13-17, 19-35, and 37-52. Applicant has amended claims 1-4, 6, 8-11, 15-17, 21-27, 32-33, 35, 38, 40-44, 46, and 48-49 and canceled claims 19-20, 31, 34, 37, 39, 45, and 51-52. These amendments were made in order to clarify the claims. No new matter has been added. Claims 1-11, 13-17, 21-30, 32-33, 35, 38, 40-44, and 46-50 remain pending after entry of these amendments

## Objections to the Drawings

The Examiner has objected to the drawings because “Fig. 2 still contains multiple references to 201-P, and 210-P.” Applicant respectfully points out that after the last amendment filed February 15, 2005, Fig. 2A now contains one reference each to 201-P, 210-P, and 220-P. Fig. 2A also contains one reference each to 201-p, 210-p, and 220-p. This labeling follows a convention that uses upper case letters to denote constants and uses lower case letters to denote variables. In this case the total number of devices connected to the transmission medium is denoted by the constant P. The labels 201-p, 210-p, and 220-p refer to an arbitrary device chosen from the set of devices and labeled with an integer between 1 and P. This convention is used to explain the figures in the portion of the specification that describes the drawings. Applicant respectfully requests that the Examiner remove the objection to the drawings.

Figures 2B, 2C, 4, 5, and 9 have been amended to correct typographical errors. For completeness, all of the formal figures are being submitted with this response.

### **Information Disclosure Statements**

Applicant points out that several of the filed Information Disclosure Statements have not been returned signed by the Examiner. In particular, the following Information Disclosure Statements have not been returned: Supplemental IDS filed August 26, 2005; Second Supplemental IDS filed October 4, 2005; Third Supplemental IDS filed February 15, 2006; and the Sixth Supplemental IDS filed May 4, 2006. Copies of the Forms PTO/SB/08 form that lists the references cited in those Information Disclosure Statements are attached to this response. Applicant requests that the Examiner indicate that the references cited in these disclosures have been considered.

### **Objections to the Claims**

The Examiner has objected to claim 40 and suggests replacing the word “filter” in line 1 with “filtering.” Applicant has amended claim 40 as suggested by the Examiner.

The Examiner has objected to claim 52 and suggests to rewrite claim 52 after the preamble to better define the invention. Claim 52 has been canceled in this amendment and the subject matter of claim 52 has been incorporated into claim 46 to better define the invention.

Applicant requests that the Examiner remove this objection to claim 40.

### **Claim Rejections under 35 U.S.C. § 112**

#### **Claims 1-11, 13-17, and 19-26**

The Examiner has rejected claims 1-11, 13-17, and 19-26 under 35 U.S.C. § 112, first paragraph, “as failing to comply with the written description requirement.” Specifically, the Examiner states that “[t]he specification does not include any description of a single-step down conversion circuit” (Office Action, paragraph 6). Applicant respectfully disagrees and refers the Examiner to p. 17 of the specification at lines 26-27 and Fig. 5. Here the received signal is mixed with sine and cosine waves at one of the carrier frequencies to shift the sub-channel signal

directly to the base-band before further processing. A single-step down conversion circuit is described.

Claim 20 has been canceled. Applicant respectfully submits that claims 1-11, 13-17, 19, 21-22, and 23-26 do comply with the written description requirement under 35 U.S.C. § 112, first paragraph and requests that the Examiner withdraw this rejection.

Claims 27-35 and 37-43

The Examiner has rejected claims 27-35, and 37-43 under 35 U.S.C. § 112, first paragraph, “as failing to comply with the written description requirement.” Specifically, the Examiner states that “[t]he specification does not include any description of a single up conversion step” (Office Action, paragraph 7). Applicant respectfully disagrees and refers the Examiner to p. 15 of the specification at lines 18-22 and Fig. 4. Here the base-band signals are mixed with sine and cosine waves at one of the carrier frequencies to shift the sub-channel signal directly from the base-band to the carrier frequency. Thus a single up-conversion step is described in the specification. Applicant respectfully submits that claims 27-35 and 37-43 comply with the written description requirement under 35 U.S.C. § 112, first paragraph, and requests that the Examiner withdraw this rejection.

Claims 44-45

The Examiner has rejected claims 44-45 under 35 U.S.C. § 112, first paragraph, “as failing to comply with the written description requirement.” Specifically, the Examiner states that “[t]he specification does not include any description of means for transmitting” (Office Action, paragraph 8). Applicant respectfully disagrees and refers the Examiner to p. 15 of the specification at lines 18-22 and Fig. 4. Here the base-band signals are mixed with sine and cosine waves at one of the carrier frequencies to shift the sub-channel signal directly from the base-band

to the carrier frequency. Thus a means for transmitting that includes an up-converter that up-converts in a single step is described. Applicant respectfully submits that claims 44-45 comply with the written description requirement under 35 U.S.C. § 112, first paragraph, and therefore requests that the Examiner remove this rejection.

#### Claims 46-52

The Examiner has rejected claims 46-52 under 35 U.S.C. § 112, first paragraph, “as failing to comply with the written description requirement.” Specifically, the Examiner states that “[t]he specification does not include any description of a receiver portion that includes a down-conversion circuit that down-converts in a single step” (Office Action, paragraph 9). Applicant respectfully disagrees and refers the Examiner to p. 17 of the specification at lines 26-27 and Fig. 5. Here the received signal is mixed with sine and cosine waves at one of the carrier frequencies to shift the sub-channel signal directly to the base-band before further processing. Thus a receiver portion that includes a down-conversion circuit that down-converts in a single step is described. Applicant respectfully submits that claims 46-50 (claims 51-52 having been canceled) do comply with the written description requirement under 35 U.S.C. § 112, first paragraph, and request that the Examiner remove this rejection.

#### Claim Rejections Under 35 U.S.C. § 103

The applicant respectfully disagrees with some of the Examiner’s statements made in support of the Examiner’s rejections. Some of these points of disagreement are rendered moot by unrelated amendments to the claim being rejected or claims that it depends from. In the interest of brevity, not all such disagreements are addressed in these remarks. The applicant wishes to make clear that silence on issues not directly addressed through amendment should not be interpreted as acquiescence to the Examiner’s analysis.

The Examiner has cited an inordinate amount of art in various combinations in the rejection of the claims. As is further discussed below, none of the art cited teach “wherein the receiver includes K demodulators, each of the K demodulators receiving signals on one of the K frequency separated channels, at least one of the K demodulators including an analog down converter that converts the signal corresponding to that channel associated with the at least one of the demodulators to a base-band signal in a single step,” as is recited claim 1, “receiving a receive sum signal from the single conducting differential transmission medium, the receive sum signal being the transmit sum signal after transmission through the single conducting differential transmission medium; down-converting the received sum signal in a single analog down-conversion step for each of the K carrier frequencies into a set of K signals at a base band frequency,” as is recited in claim 27, “means for receiving data from the K channels, the means for receiving including an analog down converter and an analog to digital converter coupled to the analog down converter,” as is recited in claim 44, or “wherein at least one of the K demodulators comprises an analog down-conversion circuit that receives the signal from the second single conducting differential transmission medium and generates a symbol by converting the signal at the carrier frequency appropriate for the one of the K demodulators,” as is recited in claim 46.

#### Claim 1

The Examiner has rejected claim 1 under 35 U.S.C. § 103(a) as being unpatentable over Shivley et al. (U.S. Patent No. 6,418,161) (“Shivley”) in view of Merriam, Jr. (U.S. Patent No. 6,975,685) (“Merriam”). Neither Shivley nor Merriam teach “the receiver includes K demodulators, each of the K demodulators receiving signals on one of the K frequency separated channels, at least one of the K demodulators including an analog down converter that converts the signal corresponding to that channel associated with the at least one of the demodulators to a

base-band signal in a single step; an analog-to-digital converter coupled to receive the base-band signal from the analog down converter and generate a digitized base-band signal,” as is recited in claim 1 (as amended), which clearly states that the signal is digitized in each of the demodulators only after the single step analog down conversion to the base band of the carrier frequency associated with that demodulator.

As the Examiner points out, “Shively is silent as to a down-conversion circuit.” (Office Action, page 5). Further, Shively teaches that all data processing in transmission and in receiving data, including modulating the data in each of the separate channels and stripping the modulation frequency from the separate channel, is performed digitally. As taught by Shively, with reference to Figure 4,

[a] serial-to-parallel buffer 41 segments a serial stream of digital data into N frames, each having allocated to it  $k_i$  bits of data. These are applied to respective inputs of a multi-carrier modulator 42 which generates a QAM tone for each channel. Multi-carrier modulator generates N QAM tones, one for each channel, at the same symbol rate but with a respective constellation for each channel. That is, the  $i^{\text{th}}$  QAM channel carries an  $2^{k_i}$ -ary QAM tone, a tone with  $2^{k_i}$  signal points. Multi-carrier modulator modulates N subcarriers by corresponding symbols to generate the N QAM signal tones using an inverse digital Fourier transform. The allocation of bits in serial-to-parallel buffer 41 is discussed in detail below.

A parallel-to-serial converter 43 adds a cyclic prefix (one known method of preventing intersymbol interference) and sums the separate modulated data and passes the resulting data stream through an D/A converter 44 yielding a single analog signal stream. After the analog signal reaches receiving modem 32, the opposite operation occurs in A/D converter 46, serial-to-parallel converter 47, and multicarrier demodulator 48 and detector 49. Multicarrier demodulator 48 strips the modulating signal from the carrier, that is, it converts the QAM tone data into data representing the original modulating symbols.

(Shively, col. 10, lines 34-58). Therefore, as described, Shively teaches a system where all recovery of data is done digitally, including stripping “the modulating signal from the carrier.”

Further, the conversion to an analog signal in the transmitter is performed as the last step, after the separate modulated data is summed.

Merriam, which the Examiner contends cures the defects in the teachings of Shively, also does not teach “the receiver includes K demodulators, each of the K demodulators receiving signals on one of the K frequency separated channels, at least one of the K demodulators including an analog down converter that converts the signal corresponding to that channel associated with the at least one of the demodulators to a base-band signal in a single step; an analog-to-digital converter coupled to receive the base-band signal from the analog down converter and generate a digitized base-band signal,” as is recited in claim 1 (as amended). As is shown in Figure 1 of Merriam, the first step in the receive process is digitization of the received signal. As Merriam teaches,

[a] receiver is configured to operate on this data stream (that is, a data stream representative of all the channels within the frequency band of interest, and having multiple samples for each symbol period of each channel), sequencing through the multiple channels to phase correct, time correct, and equalize the data stream for all the constituent channels. That is, **rather than dedicating a different receiver to each channel, the receiver is synchronized with the data stream provided by the front-end processor and cycles through the data for each channel** to equalize, phase- and time-correct the incoming signals.

(Merriam, col. 2, lines 24-34) (emphasis added). Merriam teaches that reference to Figure 1 that “illustrates a communication system 100 in accordance with the principles of the present invention that employs digitally modulated signals operating in a band of frequencies that is divided into two or more non-overlapping channels, with each channel occupying no more than a predetermined maximum frequency band.” (Merriam, col. 3, lines 43-49). In particular, “receiver system 104 may include an analog to digital converter (ADC) 106, a front end processor 108 and a back end processor, or receiver 110.” (Merriam, col. 3, lines 55-57). Further, “[t]he front end processor 108 may be configured to receive a data stream that represents

the entire frequency band sampled at a rate that is at least twice the highest frequency within the frequency band.” (Merriam, col. 3, lines 58-61). Therefore, Merriam teaches a system where the signal received from the transmission medium is immediately digitized and processed digitally. In particular, demodulation is accomplished digitally.

Consequently, neither Shively nor Merriam teaches that “the receiver includes K demodulators, each of the K demodulators receiving signals on one of the K frequency separated channels, at least one of the K demodulators including an analog down converter that converts the signal corresponding to that channel associated with the at least one of the demodulators to a base-band signal in a single step; an analog-to-digital converter coupled to receive the base-band signal from the analog down converter and generate a digitized base-band signal,” as is recited in claim 1 (as amended).

Applicant respectfully submits that claim 1, as currently amended, is in condition for allowance and requests that the Examiner withdraw this rejection.

#### Claims 2-3, 6, 15, and 16

The Examiner has rejected claims 2-3, 6, 15, and 16 under 35 U.S.C. § 103(a) as being unpatentable over Shively in view of Merriam as applied to claim 1 above, and further in view of Esteban et al. (U.S. Patent No. 4,455,649) (“Esteban”). As discussed above, claim 1 is allowable over the combination of Shively and Merriam. Esteban does not cure the defects in the teachings of Shively and Merriam and therefore claim 1 is allowable over the combination of Esteban, Shively, and Merriam. Claims 2-3, 6, 15, and 16 are dependent from Claim 1 and are thus allowable for at least the reasons set forth in connection with Claim 1.

Applicant respectfully submits that claims 2-3, 6, 15, and 16 are in condition for allowance and requests that the Examiner withdraw this rejections.

Claim 17

The Examiner has rejected claim 17 under 35 U.S.C. § 103(a) as being unpatentable over Shively in combination with Merriam and Esteban as applied to claim 16 above, and further in view of Applicant's Admitted Prior Art ("AAPA"). As discussed above, claim 1 is allowable over the combination of Shively, Merriam, and Esteban. The AAPA does not cure the defects in the teachings of Shively, Merriam, and Esteban. Claim 17 is dependent from Claim 1 and is thus allowable for at least the reasons set forth in connection with Claim 1.

The applicant respectfully submits that claim 17 is in condition for allowance and requests that the Examiner withdraw his rejection.

Claims 4-5, and 7

The Examiner has rejected claims 4-5, and 7 under 35 U.S.C. § 103(a) as being unpatentable over Shively in combination with Merriam and Esteban as applied to claim 3 above, and further in view of Rowan et al. (U.S. Patent No. 6,407,843) ("Rowan"). As discussed above, claim 3 is allowable over the combination of Shively, Merriam, and Esteban. Rowan does not cure the defects in the teachings of Shively, Merriam, and Esteban and therefore claim 3 is allowable over the combination of Shively, Merriam, Esteban, and Miller. Claims 4-5, and 7 are dependent from claim 3 and are thus allowable for at least the reasons set forth in connection with claim 3.

Applicant respectfully submits that claims 4-5, and 7 are in condition for allowance and requests that the Examiner withdraw this rejection.

Claim 8

The Examiner has rejected claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Shively in combination with Merriam and Esteban and Rowan as applied to claim 4 above, and

further in view of Miller et al. (U.S. Patent No. 5,930,231) (“Miller”). As discussed above, claim 4 is allowable over the combination of Shively, Merriam, Esteban, and Rowan. Miller does not cure the defects in the teachings of Shively, Merriam, Esteban, and Rowan and therefore claim 4 is allowable over that combination. Claim 8 is dependent from Claim 4 and is thus allowable for at least the reasons set forth in connection with Claim 4.

Applicant respectfully submits that claim 8 is in condition for allowance and requests that the Examiner withdraw this rejection.

#### Claim 9

The Examiner has rejected claim 9 under 35 U.S.C. § 103(a) as being unpatentable over Shively in combination with Merriam and Esteban as applied to claim 6 above, and further in view of Lindholm (U.S. Patent No. 6,477,207) (“Lindholm”). As discussed above, claim 6 is allowable over the combination of Shively, Merriam, and Esteban. Lindholm does not cure the defects in the teachings of Shively, Merriam, and Esteban and therefore claim 6 is allowable over the combination of Shively, Merriam, Esteban, and Lindholm. Claim 9 is dependent from Claim 6 and is therefore allowable for at least the same reasons as is claim 6.

Applicant respectfully submits that claim 9 is in condition for allowance and requests that the Examiner withdraw this rejection.

#### Claims 10 and 11

The Examiner has rejected claims 10 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Shively in combination with Merriam as applied to claim 1 above, and further in view of AAPA. As discussed above, claim 1 is allowable over the combination of Shively and Merriam. The AAPA does not cure the defects in the teachings of Shively and Merriam and therefore claim 1 is allowable over the combination of Shively, Merriam, and the AAPA. Claims

10 and 11 are dependent from Claim 1 and are thus allowable for at least the reasons as is Claim 1.

Applicant respectfully submits that claims 10 and 11 are in condition for allowance and requests that the Examiner withdraw this rejection.

#### Claims 13 and 14

The Examiner has rejected claim 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Shivley et al. in combination with Merriam, Jr. and Esteban et al. as applied to claim 2 above, and further in view of Lindholm.

As discussed above, claim 2 is allowable over the combination of Shively in combination with Merriam and Esteban. Lindholm does not cure the defects in the teachings of Shively, Merriam, and Esteban and therefore claim 2 is allowable over the combination of Shively, Merriam, Esteban, and Lindholm. Claims 13 and 14 are dependent from claim 2 and are thus allowable for at least the reasons set forth in connection with Claim 2.

Applicant respectfully submits that claims 13 and 14 are in condition for allowance and requests that the Examiner withdraw this rejection.

#### Claims 19 and 23

The Examiner has rejected claim 19 and 23 under 35 U.S.C. § 103(a) as being unpatentable over Shively in combination with Merriam and Esteban as applied to claim 15 above, and further in view of Lindholm. Claim 19 has been canceled, the subject matter of which has been substantially incorporated into claim 1. Claim 23 has been amended to depend from claim 1. As discussed above, claim 1 is allowable over the combination of Shively, Merriam, and Esteban. Lindholm does not cure the defects in the teachings of Shively, Merriam, and Esteban and therefore claim 1 is allowable over the combination of Shively, Merriam, and Esteban.

Esteban, and Lindholm. Claim 23 is therefore allowable for at least the same reasons as is claim 1.

Applicant respectfully submits that claim 23 is in condition for allowance and requests that the Examiner withdraw this rejection.

Claims 20 and 21

The Examiner has rejected claims 20 and 21 under 35 U.S.C. § 103(a) as being unpatentable over Shively in combination with Merriam and Esteban and Lindholm as applied to claim 19 above, and further in view of Rowan. Claim 20 has been canceled. Claim 21 has been amended to depend from Claim 1, which, as discussed above, is allowable over the combination of Merriam, Esteban, Lindholm, and Rowan. Claim 21, therefore, is allowable for at least the reasons set forth in connection with Claim 1.

Applicant respectfully submits that claim 21 is in condition for allowance and requests that the Examiner withdraw this rejection.

Claims 27, 30-31, and 44

The Examiner has rejected claims 27, 30-31, and 44 under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Shively.

Claim 27 is not anticipated by Shively. Shively does not teach “up-converting each of the K analog signals in a single analog up-conversion step to form K up-converted signals corresponding with a set of K carrier frequencies,” as required by claim 27. Further, as discussed above with respect to a similar limitation in claim 1, Shively does not teach “down-converting the received sum signal in a single analog down-conversion step for each of the K carrier frequencies into a set of K signals at a base band frequency,” as is recited in claim 27.

As the Examiner points out, “Shively is silent as to a down-conversion circuit.” (Office Action, page 5). Further, Shively teaches that all data processing in transmission and in receiving data, including modulating the data in each of the separate channels and stripping the modulation frequency from the separate channel, is performed digitally. As taught by Shively, with reference to Figure 4,

[a] serial-to-parallel buffer 41 segments a serial stream of digital data into N frames, each having allocated to it  $k_i$  bits of data. These are applied to respective inputs of a multi-carrier modulator 42 which generates a QAM tone for each channel. Multi-carrier modulator generates N QAM tones, one for each channel, at the same symbol rate but with a respective constellation for each channel. That is, the  $i^{\text{th}}$  QAM channel carries an  $2^{k_i}$ -ary QAM tone, a tone with  $2^{k_i}$  signal points. Multi-carrier modulator modulates N subcarriers by corresponding symbols to generate the N QAM signal tones using an inverse digital Fourier transform. The allocation of bits in serial-to-parallel buffer 41 is discussed in detail below.

A parallel-to-serial converter 43 adds a cyclic prefix (one known method of preventing intersymbol interference) and sums the separate modulated data and passes the resulting data stream through an D/A converter 44 yielding a single analog signal stream. After the analog signal reaches receiving modem 32, the opposite operation occurs in A/D converter 46, serial-to-parallel converter 47, and multicarrier demodulator 48 and detector 49. Multicarrier demodulator 48 strips the modulating signal from the carrier, that is, it converts the QAM tone data into data representing the original modulating symbols.

(Shively, col. 10, lines 34-58). Therefore, as described, Shively teaches a system where all recovery of data is done digitally, including stripping “the modulating signal from the carrier.” Further, the conversion to an analog signal in the transmitter is performed as the last step, after the separate modulated data is summed. Therefore, claim 27 is allowable over Shively.

Claim 31 has been canceled. Claim 31 depends from claim 27 and is allowable for at least the same reasons as is claim 27.

As amended, claim 44 recites “means for receiving data from the K channels, the means for receiving including an analog down converter and an analog to digital converter coupled to

the analog down converter.” Therefore, similar to claims 1 and 27 discussed above, claim 44 is allowable over Shively.

The applicant respectfully submits that claims 27, 30, and 44 are in condition for allowance and requests that the Examiner withdraw his rejections.

Claim 28

The Examiner has rejected claim 28 under 35 U.S.C. § 103(a) as being unpatentable over Shively as applied to claim 27 above, and further in view of Lindholm. As discussed above, claim 27 is allowable over Shively. Lindholm does not cure the defects in the teachings of Shively and therefore claim 27 is allowable over the combination of Lindholm and Shively. Claim 28 is dependent from Claim 27 and is thus allowable for at least the reasons set forth in connection with Claim 27.

Applicant respectfully submits that claim 28 is in condition for allowance and requests that the Examiner withdraw this rejection.

Claim 29

The Examiner has rejected claim 28 under 35 U.S.C. § 103(a) as being unpatentable over Shively as applied to claim 27 above, and further in view of Rowan. As discussed above, claim 27 is allowable over Shively. Rowan does not cure the defects in the teachings of Shively and therefore claim 27 is allowable over the combination of Shively and Rowan. Claim 29 is dependent from Claim 27 and is thus allowable for at least the reasons set forth in connection with Claim 27.

Applicant respectfully submits that claim 29 is in condition for allowance and requests that the Examiner withdraw this rejection.

### Claims 32 and 33

The Examiner has rejected claims 32 and 33 under 35 U.S.C. § 103(a) as being unpatentable over Shively as applied to claim 31 above, and further in view of Rowan. Claims 32 and 33 have been amended to depend from claim 27. As discussed above, claim 27 is allowable over the combination of Shively and Rowan. Claims 32 and 33 are dependent from Claim 27 and are thus allowable for at least the reasons set forth in connection with Claim 27.

Applicant respectfully submits that claims 32 and 33 are in condition for allowance and requests that the Examiner withdraw this rejection.

### Claim 34 and 39

The Examiner has rejected claims 34 and 39 under 35 U.S.C. § 103(a) as being unpatentable over Shively et al. as applied to claim 27 above, and further in view of Lindholm. Claims 34 and 39 have both been canceled.

### Claims 35 and 37

The Examiner has rejected claims 35 and 37 under 35 U.S.C. § 103(a) as being unpatentable over Shively in view of Lindholm as applied to claim 34 above, and further in view of the AAPA. Claim 37 has been canceled and claim 35 has been amended to depend from claim 27. As discussed above, claim 27 is allowable over the combination of Shively and Lindholm. The AAPA does not cure the defects in the teachings of Shively and Lindholm and therefore claim 27 is allowable over the combination of Shively, Lindholm, and the AAPA. Claim 35 is therefore allowable for at least the same reasons as is claim 27.

Applicant respectfully submits that claim 35 is in condition for allowance and requests that the Examiner withdraw this rejection.

### Claim 38

The Examiner has rejected claim 38 under 35 U.S.C. § 103(a) as being unpatentable over Shively in view of Lindholm as applied to claim 34 above, and further in view of Miller. Claim 38 has been amended to depend from Claim 27. As discussed above, claim 27 is allowable over the combination of Shively and Lindholm. Miller does not cure the defects in the teachings of Shively and Lindholm. Therefore, claim 27 is allowable over the combination of Shively, Lindholm, and Miller. Claim 38 is allowable for at least the same reasons as is claim 27.

Further, claim 38, as amended, requires “providing automatic gain conversion for each of the set of K signals prior to digitizing each of the set of K signals.” In Miller, the automatic gain control operates on digital signals to facilitate slicing of the received symbols according to the appropriate constellation by eliminating “amplitude error” (Miller, Fig. 18, element 1802, column 43, lines 20-25, 51-54). In contrast the gain control recited in claim 38 is applied to the analog base-band signals received before they are passed to the analog-to-digital converter. The purpose of this gain control is to minimize quantization error introduced by the analog-to-digital converter, not to reproduce amplitudes corresponding to the QAM constellations. For this reason Miller does not disclose the gain control of claim 38, as stated by the Examiner (Office Action p. 20). Therefore, claim 38 is not obvious in light of the combination of Shively, Lindholm, and Miller.

Applicant respectfully submits that claim 38 is in condition for allowance and requests that the Examiner withdraw this rejection.

### Claim 40

The Examiner has rejected claim 40 under 35 U.S.C. § 103(a) as being unpatentable over Shively in view of Lindholm as applied to claim 39 above, and further in view of Ekvetchavit et al. (U.S. Publication No. 2002/0159551 A1) (“Ekvetchavit”). Claim 40 has been amended to

depend from claim 27. As discussed above, claim 27 is allowable over the combination of Shively and Lindholm. Ekvetchavit does not cure the defects in the teachings of Shively and Lindholm and therefore claim 27 is allowable over the combination of Shively, Lindholm, and Ekvetchavit. Claim 40 is then allowable for at least the same reasons as is claim 27.

Applicant respectfully submits that claim 40 is in condition for allowance and requests that the Examiner withdraw this rejection.

#### Claim 41 and 42

The Examiner has rejected claims 41 and 42 under 35 U.S.C. § 103(a) as being unpatentable over Shively in view of Lindholm as applied to claim 34 above, and further in view of Miller. Claims 41 and 42 have been amended to depend from claim 27. As discussed above, claim 27 is allowable over the combination of Shively with Lindholm. Miller does not cure the defects in the teachings of Shively and Lindholm and therefore claim 27 is allowable over the combination of Shively, Lindholm, and Miller. Claims 41 and 42 are therefore allowable for at least the same reasons as is claim 27.

Applicant respectfully submits that claims 41 and 42 are in condition for allowance and requests that the Examiner withdraw this rejection.

#### Claim 43

The Examiner has rejected claim 43 under 35 U.S.C. § 103(a) as being unpatentable over Shively in view of Lindholm as applied to claim 34 above, and further in view of Rowan. Claim 43 has been amended to depend from claim 27. As discussed above, claim 27 is allowable over the combination of Shively and Lindholm. Rowan does not cure the defects in the teachings of Shively and Lindholm and therefore claim 27 is allowable over the combination of Rowan,

Shively, and Lindholm. Claim 43, therefore, is allowable for at least the same reasons as is claim 27.

The applicant respectfully submits that claim 43 is in condition for allowance and requests that the Examiner withdraw his rejection.

Claim 45

The Examiner has rejected claims 45 under 35 U.S.C. § 103(a) as being unpatentable over Shively as applied to claim 44 above, and further in view of Merriam, Jr. As discussed above, claim 44 is allowable over Shively. Merriam does not make up the difference. Claim 45 is dependent from claim 44 and is thus allowable for at least the same reasons as is claim 44.

Applicant respectfully submits that claim 45 is in condition for allowance and requests that the Examiner withdraw this rejection.

Claim 46-47, and 51

The Examiner has rejected claims 46-47, and 51 under 35 U.S.C. § 103(a) as being unpatentable over Shively in view of Merriam and further in view of the AAPA. Similarly to claim 1, claim 46 has been amended to recite “wherein the receiver comprises K demodulators, each of the K demodulators coupled to receive a signal from the second single conducting differential transmission medium, the signal being a transmit sum signal transmitted through the second single conducting differential transmission medium, and retrieving one of the K subsets of data bits and a bit parsing circuit that receives each of the K subsets of data bits from the K demodulators and reconstructs the N data bits transmitted by the transmitter, and wherein at least one of the K demodulators comprises an analog down-conversion circuit that receives the signal from the second single conducting differential transmission medium and generates a symbol by converting the signal at the carrier frequency appropriate for the one of

the K demodulators, an analog to digital converter coupled to digitize the symbol from the analog down conversion circuit” As discussed above with respect to claim 1, the combination of Shively and Merriam does not teach that the demodulator includes “an analog down-conversion circuit that receives the signal from the second single conducting differential transmission medium and generates a symbol by converting the signal at the carrier frequency appropriate for the one of the K demodulators.” Therefore, as is discussed above with respect to claim 1, claim 46 is allowable over the combination of Shively and Merriam. The AAPA does not cure the defects in the teachings of Shively and Merriam. Therefore, claim 46 is allowable over the combination of Shively, Merriam, and the AAPA. Claim 47 depends from claim 46 and is therefore allowable for at least the same reasons as is claim 46. Claim 51 has been canceled.

Applicant respectfully submits that claims 46-47 are in condition for allowance and requests that the Examiner withdraw this rejection.

#### Claim 48-49

The Examiner has rejected claims 48-49 under 35 U.S.C. § 103(a) as being unpatentable over Shively in combination with Merriam and the AAPA as applied to claim 46 above, and further in view of Esteban et al. As discussed above, claim 46 is allowable over the combination of Shively, Merriam, and the AAPA. Esteban does not make up the difference and therefore claim 46 is allowable over the combination of Shively, Merriam, the AAPA, and Esteban. Claims 48 and 49 depend from claim 46 and are thus allowable for at least the reasons as is claim 46.

Applicant respectfully submits that claims 48 and 49 are in condition for allowance and requests that the Examiner withdraw this rejection.

Claim 50

The Examiner has rejected claim 50 under 35 U.S.C. § 103(a) as being unpatentable over Shively in combination with Merriam, the AAPA, and Esteban as applied to claim 49 above, and further in view of Rowan et al. As discussed above, claim 49 is allowable over the combination of Shively, Merriam, the AAPA, and Esteban. Rowan does not make up the difference and therefore claim 49 is allowable over the combination of Shively, Merriam, the AAPA, Esteban, and Rowan. Claim 50 is dependent from Claim 46 and is thus allowable for at least the same reasons as is Claim 46.

Applicant respectfully submits that claim 50 is in condition for allowance and requests that the Examiner withdraw this rejection.

Claim 52

The Examiner has rejected claim 52 under 35 U.S.C. § 103(a) as being unpatentable over Shively in combination with Merriam and the AAPA as applied to claim 51, and further in view of Lindholm. Claim 52 has been canceled.

**Conclusion**

Applicant respectfully requests that this Amendment be entered by the Examiner, placing claims 1-11, 13-17, 21-30, 32-33, 35, 38, 40-44, and 46-50 in condition for allowance. Therefore, Applicant requests a Notice of Allowability for claims 1-11, 13-17, 21-30, 32-33, 35, 38, 40-44, and 46-50.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER, L.L.P.

Dated: September 12, 2006

By: 

Gary J. Edwards  
Reg. No. 41,008

Attachments: Annotated Sheets showing changes  
Replacement Sheets  
Forms PTO/SB/08

**EXPRESS MAIL LABEL NO.**  
**EV 901562792 US**

**AMENDMENTS TO THE DRAWINGS:**

The attached sheets of drawings include changes to Figures 2B, 2C, 4, 5, and 9. These figures have been modified to correct for typos. Figure 2B has been modified to replace the label 210-P with 210-p. Figure 2C has been modified to replace the label 220-P with 220-p. Figure 4 has been modified to replace the label 212-R with 212-k and to delete an extra parenthesis from the caption for multiplier 410. Figure 5 has been modified to replace the label 222-K with 222-k. Figure 9 has been modified to replace the label 210-P with 210-p and replace the label 220-P with 220-p. No new matter has been added by these corrections.

Attachments:            Annotated Sheets showing changes  
                                  Replacement Sheets

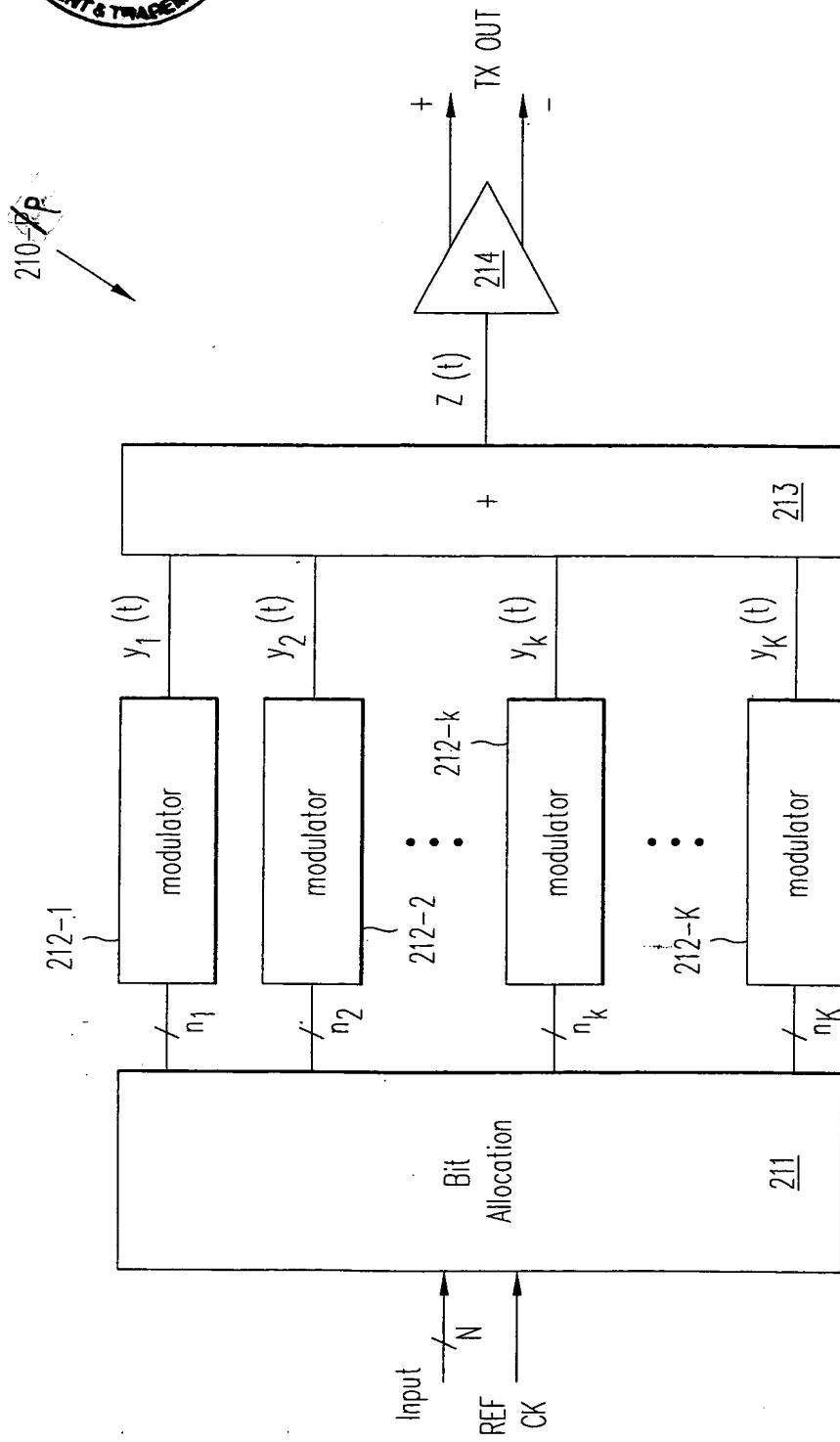


FIG. 2B

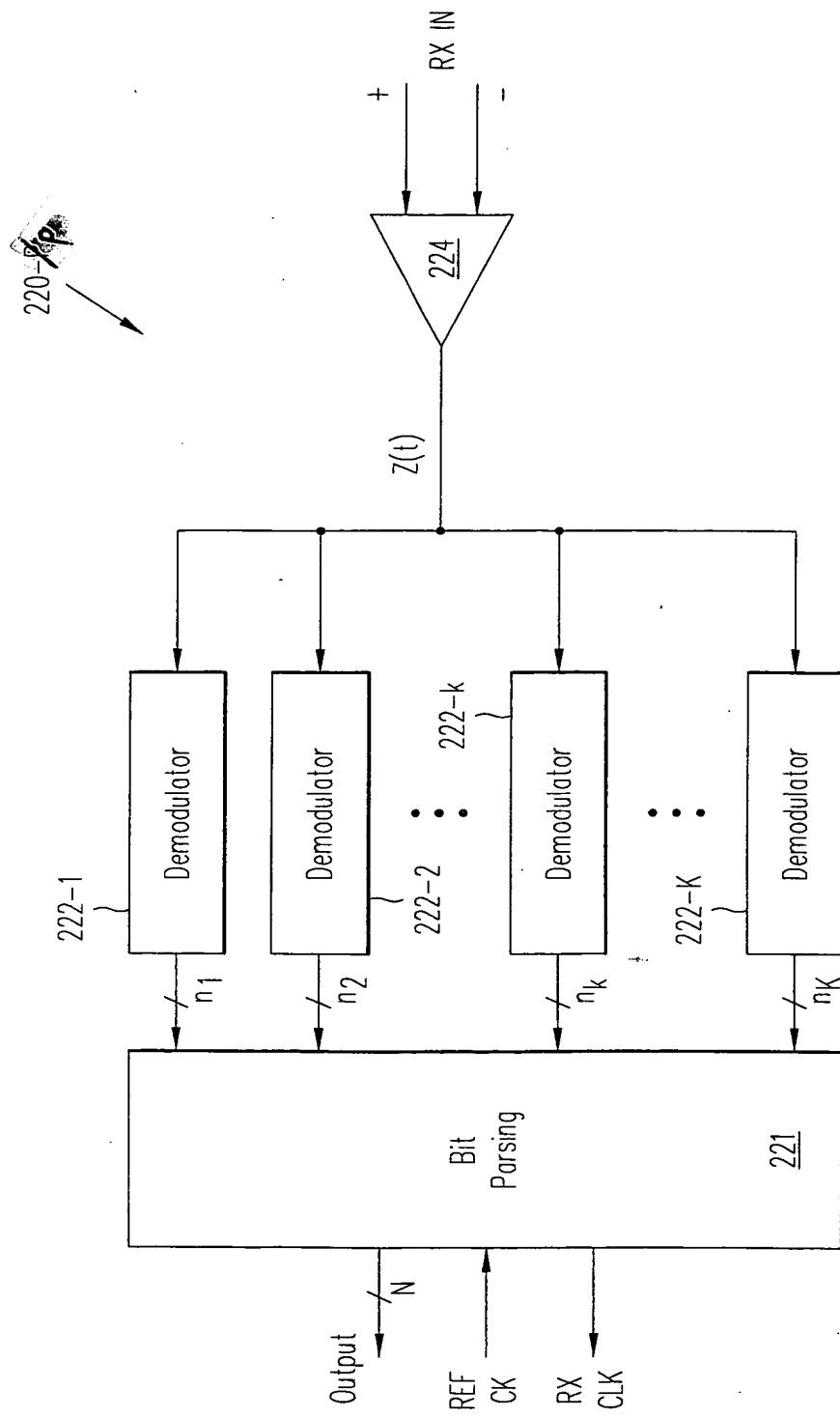


FIG. 2C

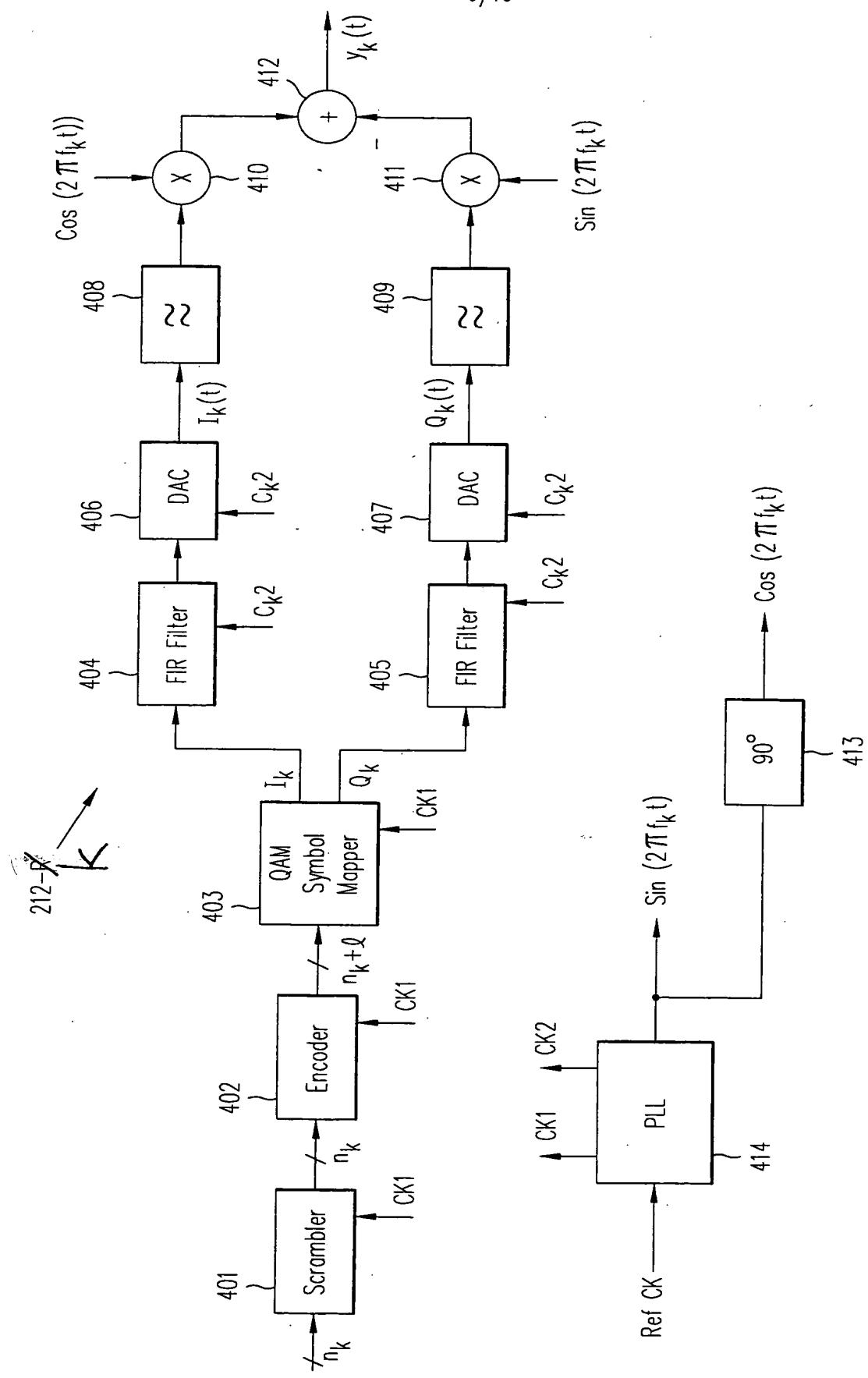


FIG. 4

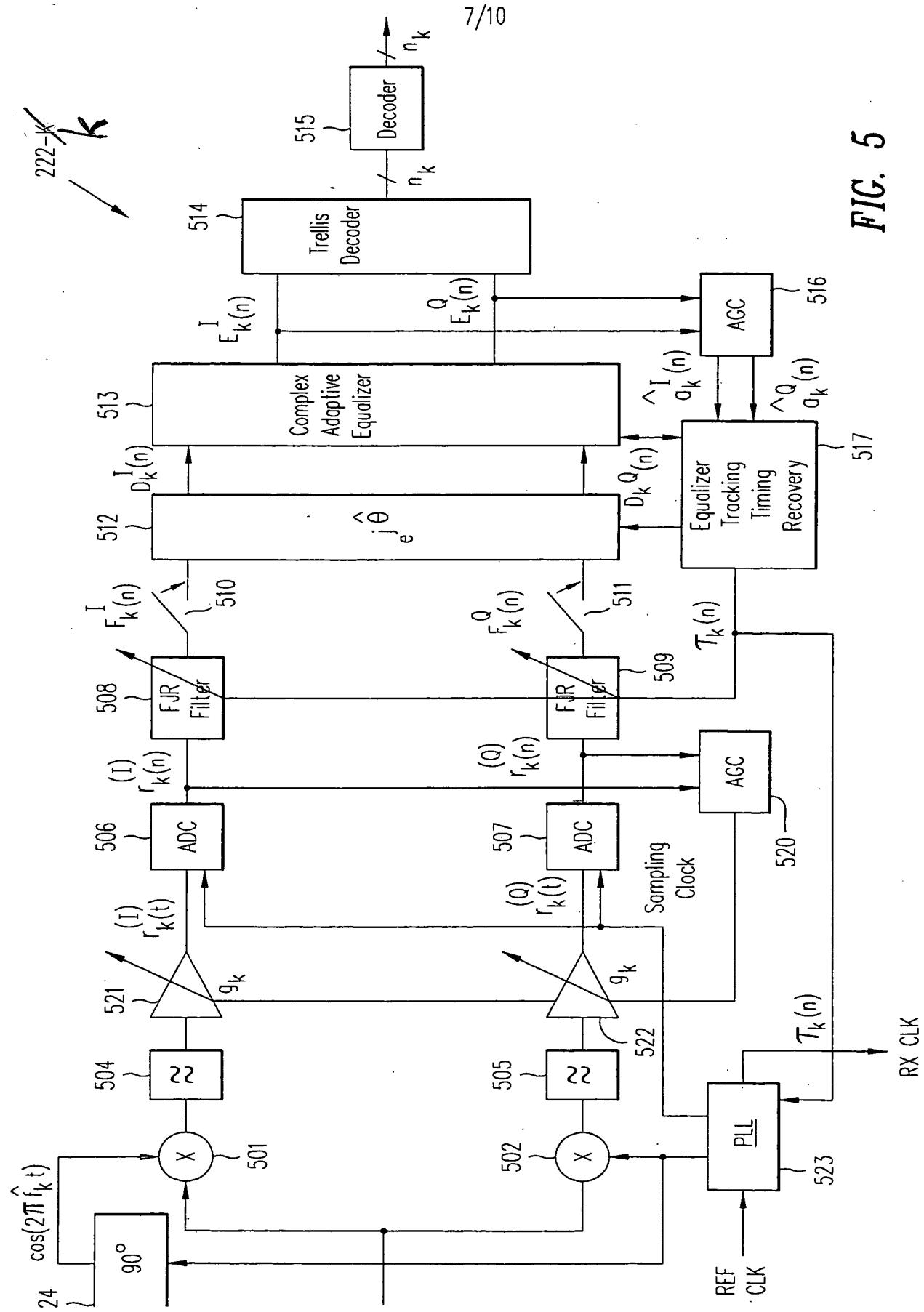


FIG. 5

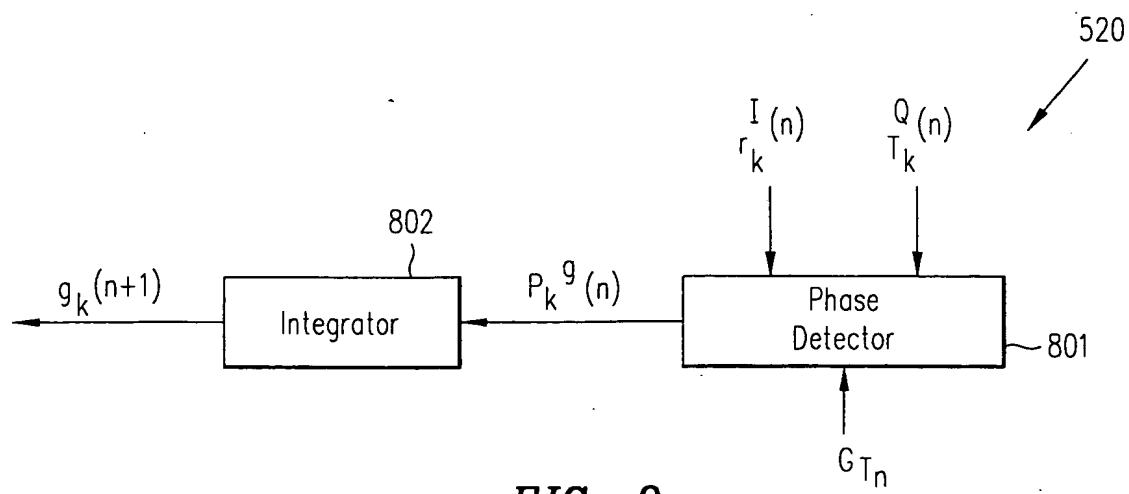


FIG. 8

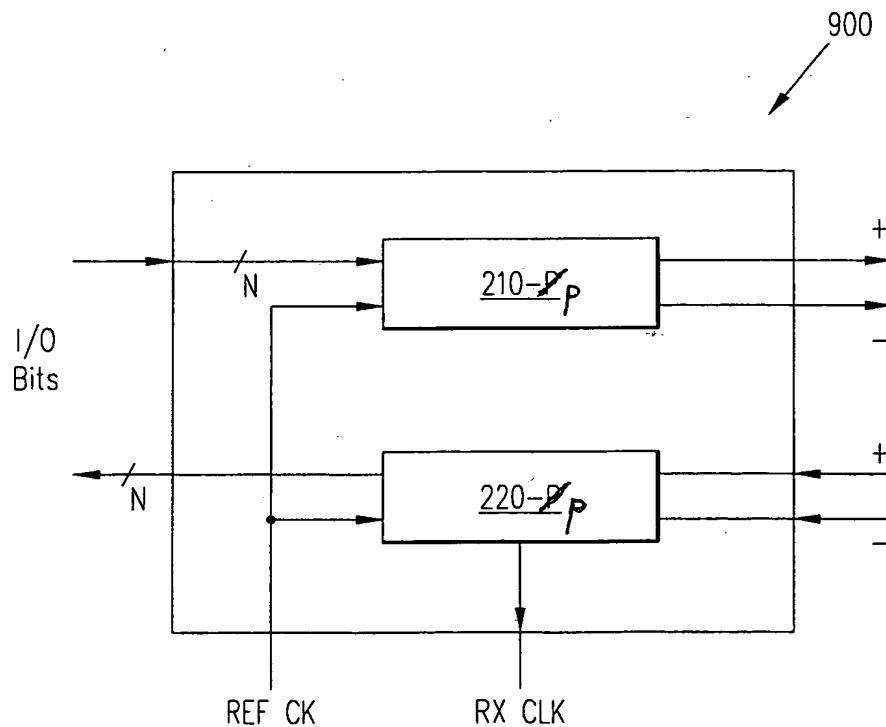


FIG. 9